Video Capture Unit for EVOLUTION• 5000-Series Thermal Imaging Cameras

Operation and Instructions

WARNING!

THIS MANUAL MUST BE READ CAREFULLY BY ALL INDIVIDUALS WHO HAVE OR WILL HAVE THE RESPONSIBILITY FOR USING OR SERVICING THE PRODUCT.

Like any piece of complex equipment, the unit will perform as designed only if it is used and maintained in accordance with the manufacturer's instructions.

OTHERWISE IT COULD FAIL TO PERFORM AS DESIGNED AND RESULT IN SEVERE PERSONAL INJURY OR DEATH.

This manual is available on the internet at www.msanet.com

Be Sure Choose MSA.

MINE SAFETY APPLIANCES COMPANY
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PO Box 426
Pittsburgh, PA 15230

Contents

1. Safety Regulations

1.1. Correct Use

The video recorder Video Capture is an accessory for the MSA EVOLUTION 5000-Series Thermal Imaging Cameras (TICs). This accessory shows the images which have been taken by the thermal imaging camera during use. The video data can later be downloaded and viewed in order to allow the user to analyze the information recorded.

The video recorder is suitable for all uses where the thermal imaging camera is also used. The recorder must, under no circumstances, be used in explosive areas.

It is imperative that this operating manual be read and observed when using the video recorder. In particular, the safety instructions, as well as the information for the use and operation of the apparatus, must be carefully read and observed. Furthermore, the national regulations applicable in the user's country must be taken into account for proper use.

WARNING!

1. The user must be trained and thoroughly familiar with the proper operation and limitations of the thermal imaging system and video transmission systems prior to use. Use in controlled live-burn exercises is suggested before using the equipment in actual emergency situations.
2. The Wireless Video System and thermal imaging system are not rated as "Intrinsically Safe". Do not use these systems in environments or atmospheres where static or sparks may cause an explosion.
3. Do not remove the receiving unit cover or casing as the system operates on high voltage. Only authorized personnel may service the unit.
4. Do not alter or modify this device.

Failure to fallow the above warnings can result in serious personal injury or death.

CAUTION!

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant FCC Part 15. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at the owner's expense.

Do not drop the Video Capture System components, otherwise, damage to the system could occur.

Alternative use, or use outside this specifications will be considered as non-compliant. This also applies especially to unauthorised alterations to the apparatus and to commissioning work that has not been carried out by MSA or authorised persons.

1.2. Warranty

MSA accepts no liability in cases where the product has been used inappropriately or not as intended. The selection and use of the product are the exclusive responsibility of the individual operator.

Product liability claims, warranties also as guarantees made by MSA with respect to the product are voided, if it is not used, serviced or maintained in accordance with the instructions in this manual.

2. Description

2.1. Overview and Brief Description of the Video Capture Unit

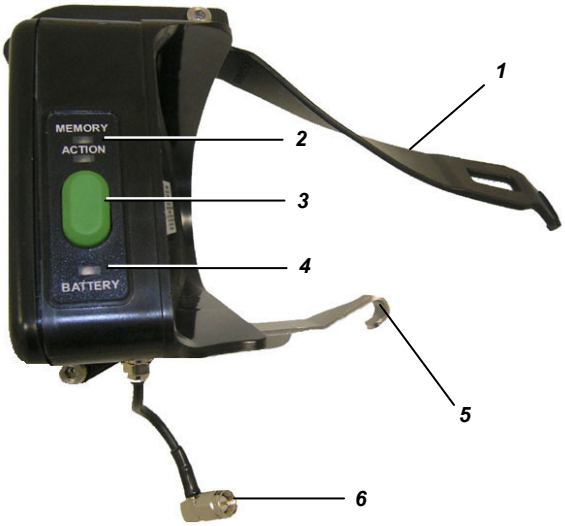

Fig. 1 Video Capture for the EVOLUTION 5000-Series TICs

1	*Connecting belt (rubber)*	*4*	*LED battery display*
2	*LED memory and status display*	*5*	*Connecting hook*
3	*ON / OFF button*	*6*	*SMA video connection*

When the thermal imaging camera is switched on, the video recorder recognises the camera video signal and automatically switches on with the camera. The recorder then shows all images on a memory card (RS-MMC card) which are displayed by the camera when in use, including the graphical and numerical temperature displays, heat displays etc.

The images are stored in MPEG1 format with sequential numbering on the RS-MMC card. The recording duration of each video file is max. 5 minutes, after which the file is closed and a new video file is created automatically. If the recorder is stopped or switched off or if the video signal is interrupted, the current video file is closed and stored in the memory. When the next recording starts a new video file is created.

The recording duration of a 512 MB RS-MMC card is, in total, approximately 2 hours.

The stored video files can be read on any personal computer (PC) that has Windows Media player or equivalent software; files are saved onto the RS-MMC card as “M1V” files. The read-out software is not included with this accessory.

The following items are included with this accessory:

- Video Capture Unit for EVOLUTION 5000-Series TICs
- SMA connection cable
- One (1) rechargeable Lithium-Ion battery
- Card reader for RS-MMC card
- RS-MMC memory card and adaptor

The thermal imaging camera system EVOLUTION 5000 Series includes the EVOLUTION 5000 transmitter, a cable-free video remote transmission system. Simultaneous use of the transmitter and video recorder is, however, not possible. The video images can either be transmitted in real time by remote data transfer using the transmitter to an operational control centre **or** be stored by the recorder for subsequent analysis.

2.2. Operating Conditions

The video recorder has 3 operating conditions:

1. ON/RECORD:	▪ Thermal imaging camera and recorder switched on ▪ Recording in progress ▪ ACTION LED on recorder flashing
2. OFF:	▪ Thermal imaging camera and recorder switched off ▪ All LEDs on camera and recorder are switched off
3. STOP/PAUSE	▪ Thermal imaging camera switched on but recorder switched off ▪ No recordings are taken ▪ LEDs on recorder switched off

2.3. LED indicators

LED	Meaning of the LED Indicators	
MEMORY	**Memory status of RS-MMC card**	
	LED briefly flashing green[1)]	= RS-MMC card empty (full storage capacity)
	LED slow flashing green[1)]	= Sufficient memory for more than 1 hour's recording
	LED red flashing	= RS-MMC card has only approx. 15 minutes recording time left
	LED red	= RS-MMC card full (no more recording possible)
	LED rapid flashing red	= RS-MMC card missing or faulty
ACTION	**Status indicator (operating status)**	
	LED flashing green	= Recording in progress
	LED flashing red/green	= Temperature in unit exceeding 120 °C, another 5 minutes operation before automatic switch-off
	LED red	= Fault display (no recording)
	LED flashing red	= Missing or bad video signal
BATTERY	**Battery charging status indicator**	
	LED green	= battery is fully charged
	LED yellow	= battery still has 50 % residual capacity
	LED red	= battery warning, battery has residual capacity for approx. 15 min. more
	LED red flashing	= battery is flat, recorder switches off within 1 minute, even if there is a video signal (emergency switch-off)

1) The lighting duration of the green MEMORY LED during flashing indicates the capacity of the RS-MMC card. The longer it remains lit, the fuller the memory card is.

3. Use

3.1. Connecting the video recorder to the thermal imaging camera

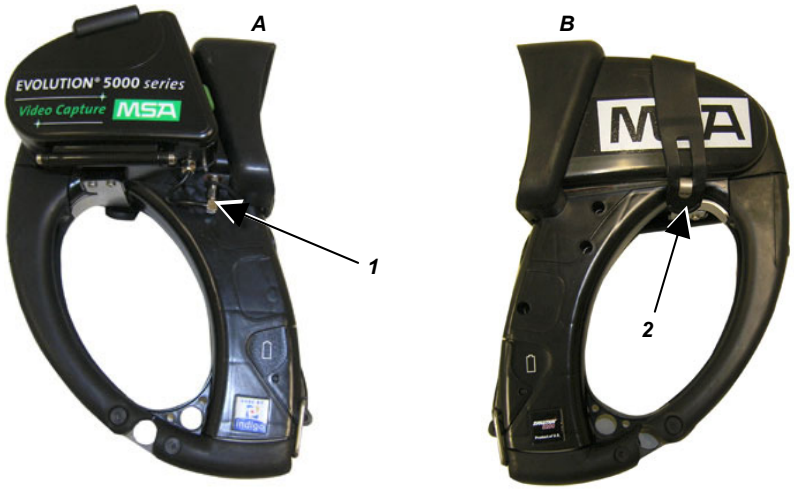

Fig. 2 Connecting the video recorder to the thermal imaging camera

A	*Left side of TIC with recorder attached*	*1*	*Connection SMA video connection cable with camera*
B	*Right side of TIC with recorder attached*	*2*	*Connection to the fixing hook*

(1) Place the recorder on the left-hand side of the camera, pull the fixing belt over the camera and connect to the fixing hook.

(2) Connect the SMA video connection cable of the video recorder to the camera as follows:

- Remove the rubber cover from the SMA video output connector on the camera.
- Connect the SMA adapter cable to the SMA video output connector.

3.2. Switching On and Off

The video recorder automatically switches on with the thermal imaging camera as soon as it detects a video signal from the camera. If the thermal imaging camera is switched off, the recorder also switches off if there is no video signal for longer than 2 seconds.

The video recorder can also be switched off and on again independently of the thermal imaging camera.

Switch-off

(1) Keep the green ON/OFF button on the thermal imaging camera pressed for approx. 5 seconds.
- The recorder switches off automatically 2 seconds after the failure of the video signal at the latest.

(2) Release the green ON/OFF button on the camera as soon as all the LED displays on the camera have gone out.

If the video signal fails for more than 2 seconds, the current video file is closed and the recording is continued with a new video file as soon as a video signal appears again.

Switch-on

(1) Press green ON / OFF button on the thermal imaging camera for approx. 1 second.
- The recorder switches on after approx. 3 seconds and the recording starts automatically.

Switching off and on with the camera running

The video recorder can be switched off with the camera running (= STOP / PAUSE) and then be switched on again.

(1) Switch-off Press green ON / OFF button on the video recorder for approx. 5 seconds.
- The recorder is in the pause position. No recordings are created even though the camera continues to run.

(2) Switch-on Press green ON / OFF button on the recorder for approx. 5 seconds.

3.3. Replacing the Batteries

The video recorder is supplied with a Lithium-Ion battery. When replacing batteries, it is always best to use MSA Lithium-Ion batteries, P/N 10038412.

Spare batteries must have the same power rating and design as those supplied by MSA with the Video Capture Unit. Unsuitable batteries can lead to a failure of the system.

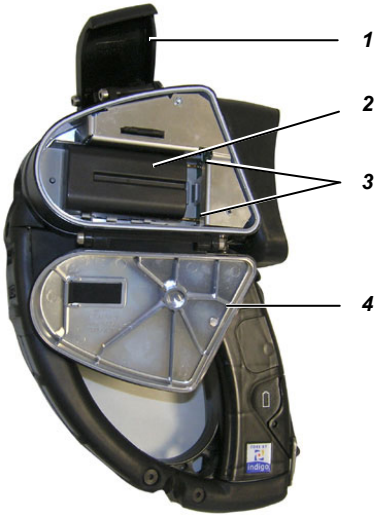

Fig. 3 Replacing the battery

1 Latch for recorder cover
2 Battery
3 Battery contacts
4 Opened recorder cover

(1) Release the recorder cover catch and open the cover.
(2) Remove the old battery
(3) Place the charged battery in the correct position in the battery compartment.
(4) Close the recorder cover and re-engage the catch.

WARNING!

This system is not rated as "intrinsically safe. Never replace the batteries in **environments or atmospheres where static or spark may cause an explosion** since the batteries can spark when being changed! Caution - danger of injury!

For charging the lithium ion batteries use the MSA desktop battery charger or the replacement charging unit on the MSA vehicle mounted charger

3.4. Erasing the data on the RS-MMC card

Using an internal button, it is possible to erase all the video files on the RS-MMC card being used. This means that the full memory capacity of the RS-MMC card will be available again for the next use.

Prerequisites:

- The thermal imaging camera must be connected and must be running.
- The video recorder must be switched off (STOP/PAUSE):
  Press green ON / OFF button on the recorder for approx. 5 seconds.

For the actuation of the internal button, a thin pointed instrument will be required, e.g. a paper-clip.

Fig. 4 Erasing the RS-MMC card

1 Actuate the internal button with a thin instrument

2 ON/OFF button on the recorder

Erasing the RS-MMC card:

(1) Release the recorder cover catch and open the cover.

(2) Press the internal button (→ Fig. 4) for approx. 5 seconds with a thin pointed instrument through the small hole.

Always make sure that the battery is properly connected to ensure that the power supply is not interrupted.

- All LEDs flash red during the erasing process.
- All LEDs flash green when all the video files have been deleted.

If the button is released before 5 seconds have elapsed the files are not deleted.

(3) Close the recorder cover and re-engage the catch.

(4) Switch the video recorder on again using the green ON/OFF button on the recorder.

3.5. Removing and inserting the RS-MMC card

The recorder is supplied with an empty formatted RS-MMC card. The adaptor provided can be used to remove and insert the memory card.

Prerequisites:

The RS-MMC card can be removed or replaced if

- the recorder is switched off (no LED is lit) or
- no recording is taking place e.g. because of a fault (ACTION-LED lit continuously).

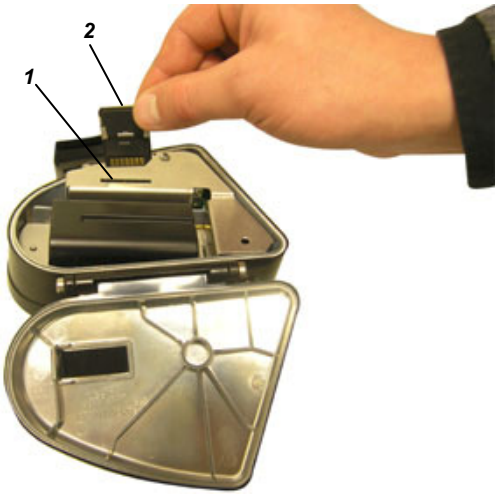

Fig. 5 Removing and inserting the RS-MMC card

1 Slot in recorder body for memory card

2 RS-MMC card with adaptor

RS-MMC card removal

CAUTION!

Do not remove the RS-MMC card during recording. The file system on the card could otherwise be destroyed and the video data no longer be readable. In addition, it's possible that the RS-MMC card will not store any more video data.

(1) Release the recorder cover catch and open the cover.

(2) Push the card carefully into position until a slight click is heard and then release.

- After releasing, the card will be pushed out a few millimeters and can be removed (ejection mechanism).

(3) Push the memory card into the card reader with the help of the adaptor (→ Section3.6) and/or place another RS-MMC card into the recorder.

(4) Close the recorder cover and re-engage the catch.

If the recorder is operated without a RS-MMC card this is displayed as a fault (MEMORY LED flashes rapidly).

RS-MMC card insertion

(1) Release the recorder cover catch and open the cover.

(2) Push the RS-MMC card carefully into the slot provided with the contacts downwards and with the bevelled corner to the right (→ Fig. 5) until the stop is reached. Release the card as soon as a slight click is heard.
If the adaptor has been used, disconnect it from the RS-MMC card now.

- When releasing, it clicks once again and the RS-MMC card is inserted.
- The fitted RS-MMC card is initialised by the video recorder and further recording is possible.

(3) Close the recorder cover and re-engage the catch.

When using an RS-MMC card that has existing video files, the recorder will begin a new sequence of file numbers beginning with the next highest file number in the sequence. For example, if the RS-MMC card has several files numbering from “0001” through “0008”, the next file recorded will be “0009”.

3.6. Reading out the video data on a PC using MS Windows

Access to the RS-MMC card is via the card reader. The memory card appears under windows as an exchange data carrier if it does not have a data carrier name. The video data can then be copied, erased or displayed using suitable reproduction software on the PC.

Observe the operating manual for the operation of the memory card reader.

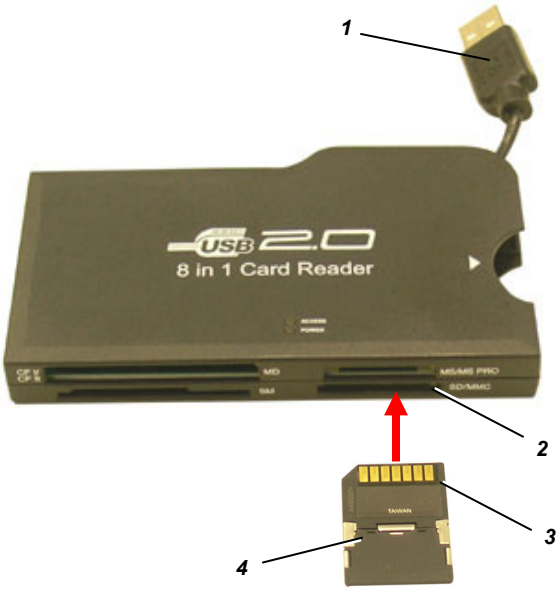

Fig. 6 Memory card reader

1	*USB plug for PC connection*	*3*	*RS-MMC card*
2	*SD/MMC slot for RS-MMC card*	*4*	*Adaptor*

(1) Connect the USB plug to the USB connection on the PC.

(2) Push the adaptor onto the RS-MMC card.

(3) Insert the card into the SD/MMC slot on the reader using the adaptor so that the contacts point upwards and the bevelled corner is to the left.

(4) Play and/or process the video data on the PC.

(5) Remove the RS-MMC card from the reader. To do this, in Windows Explorer right click on the drive for the exchange data carrier or on the data carrier name of the RS-MMC card and select the option `Eject`.

Video files are recorded as “M1V” files and will play in the following digitial media software programs:

- Windows Media Player
- Real Player
- QuickTime

Some media players may list the files as being less than five (5) minutes in length. However, when the files are played, they are the proper length (five minutes)

3.7. Help in Windows in the event of problems with the RS-MMC card

RS-MMC card is not recognized as an exchange data carrier

If, in Windows, the RS-MMC card is not recognized as an exchange data carrier, it is possible that the memory card is not correctly inserted in the reader. Check that the card is

- in the correct SD/MC slot,
- that the contacts are pointing upwards and that the bevelled corner is on the left (→ Fig. 6).

Data system damaged, faulty video files

If the file system on the RS-MMC card is damaged (by incorrect operation, quality or software problems) it can occur that the video files on the RS-MMC card, although visible, cannot be opened. If the files are to be processed using Windows programmes, the following remedy can be used:

(1) In Windows Explorer right click on the drive for the exchange data carrier or on the data carrier name of the RS-MMC card and call up the option "`Properties`" in the context menu.

(2) Select index card "`Extras`".

(3) Start "`Fault check`" and select the following options:

- "`Correct file system fault automatically`"
- "`Search/recreate faulty sectors`"

Reformatting the RS-MMC card

If the video files cannot be repaired as described above, the original condition as supplied can be restored by reformatting the RS-MMC card with the format FAT16.

CAUTION!

When reformatting the RS-MMC card, all the data stored on the card will be lost.

Formatting can be done using the software contained in Windows:

(1) In Windows Explorer right click on the drive for the exchange data carrier or on the data carrier name of the RS-MMC card and call up the option "`Formatting`" in the context menu.

(2) In the selection menu for the file system select "`FAT16`" and start the formatting process.

- After successful formatting, all the data stored on the RS-MMC card is erased.
- The RS-MMC card has full storage capacity once again.

In the case of memory cards with a memory larger than 512 MByte, it is possible that the file system option "`FAT32`" may be pre-selected. The setting must be changed to "`FAT16`" or to "`FAT`".

4. Maintenance and Cleaning

4.1. Maintenance Instructions

The product should be regularly checked and serviced by specialists. A record must be kept of inspection and maintenance. Always use original parts from MSA.

Repairs and maintenance must be carried out only by authorized MSA service centres. Changes to devices or components are not permitted and could result in loss of approved status.

MSA is liable only for maintenance and repairs carried out by MSA.

4.2. Maintenance of the video recorder

Each time the video recorder is used, a visual inspection must be performed following the criteria below:

- Is there damage to the casing through mechanical, chemical or thermal loads?
- Loose or missing screws, O-rings or seals?
- Are all the device labels attached?

Recorders and accessories which do not pass this inspection must be removed from service until they have been repaired.

4.3. Cleaning the video recorder

After each use:

- Carefully clean the external surfaces with warm water and a mild detergent.
- Then carefully dry using a soft, lint-free cloth.
- All connectors, video connector, ON/OFF button, battery compartment lock and lid must be checked for dirt and cleaned using a soft, lint-free cloth and brush if necessary.

CAUTION!

Do not use solvents or paint thinners to clean the video recorder ; otherwise the protective case may become degraded.

Do not use abrasive cleaners or cloths for cleaning the recorder as these could damage the recorder.

4.4. Battery Care

Each time the Video Capture Unit is used, the batteries must be checked following the criteria below:

- Damage or leaks on the batteries?
- Damage to the battery contacts?
- Perfect operation of the recorder and all indicators?

Batteries failing the above listed inspection points must be replaced.

WARNING!

It is possible that charge can be terminated abnormally. While this condition is rare, it can occur because of external i-band-noise that may reach the charger electronics. In the unlikely event that charge falsely terminated because of noise, the battery may not fully charge. Always use the video recorder battery gauge as an indicator of battery condition.

5. Technical Data

Housing	Flame and heat resistant, Material complies with the test requirements of US standard ▪ NFPA 1981-2002 Ed - Direct Flame test and ▪ NFPA 1982-1998 Ed - Radiant Heat test. IP67 (Submerge up to 1 metre water depth, for 30 min).
Dimensions	4.72 x 5.51 x 4.72 in (H x W x D)
Weight	approximately 9.7 ounces without battery, approximately 12 ounces with battery
Image resolution	160 x 120 pixel
Power supply	Lithium-Ion battery 7.2 V
Energy consumption	1.8 W nominally at 71°F (22 °C)
Operating time	5 hours at 71°F (22 °C)
Video format	MPEG 1 (M1V)

6. Ordering Information

Designation	**Part No.**
Video Capture unit with one (1) Lithium-Ion battery, RS-MMC card (512MB), MMC memory card reader, operating manual and carrying case	10071750
Accessories for the Video Capture Unit	
Lithium-Ion battery	10038412
RS-MMC memory card 512 MB	10069792
MMC memory card reader	10069791
Operating manual	10070600
Optional Accessories	
Charger 220/230V alternate power	10043951

MSA Factory Repair & Service Policy Card

To help process your repair requests, please provide the following information: *Please complete this form in full. Thank you.*			
Customer´s billing address:		Customer´s shipping address:	
Company Name		Company Name	
Street / P.O. Box		Street / P.O. Box	
City / State / Zip		City / State / Zip	
Contact name		Phone number	
Product name		Fax number	
Model number		Your PO number	

To save time - please check **ONE** of these alternatives:		Description of problem / special instructions:
	Repair and return [PO number must be provided	
	Estimate required before return	
	Warranty claim [original MSA invoice no._____	
	Medical RA no._____	

Authorized by:	Title:		Date:

FOR CALIBRATION OR REPAIR; PLEASE PROVIDE THE INFORMATION REQUESTED ABOVE: PLEASE USE A SEPERATE SHEET FOR EACH EQUIPMENT / UNIT.

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